**Impacts of High Discharge from Island Park Reservoir on Downstream Temperature, Turbidity, and Dissolved Oxygen**

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Reservoirs increase water residence time and impose stratification, greatly influencing downstream water quality. Island Park Reservoir is an irrigation storage and delivery reservoir on the Henry's Fork and has a capacity equal to one third of mean annual inflow. Recently, anglers and fishing guides have expressed concerns about increased release of sediment during periods of high downstream delivery and potential impacts on trout growth and survival. To address these concerns, we investigated the impact of high summer discharge on water quality, focusing on changes in temperature, turbidity, suspended sediment concentration (SSC), and dissolved oxygen level (DO). We collected data prior to, during, and after the 2015 irrigation season at both reservoir outflow points: the power plant, which discharges a maximum of 960cfs during periods of high delivery, and the dam gate, which is used to deliver any remaining required delivery in excess of 960cfs and which has a 30-foot lower withdrawal depth than the power plant.

After accounting for seasonal effects, we found that total discharge greater than 1,100cfs consistently resulted in an average DO increase of 2 mg/L and an average temperature decrease of 1.5˚C. These are beneficial changes in habitat for trout during the summer months because warm temperatures increase their metabolism and oxygen demand, and temperatures at the upper range of their tolerance can stem growth. We found a relatively small increase in turbidity during high-delivery periods (average increase of 2.5 FNU) and found that half of the delivered SSC was organic carbon. We will present a physical explanation for explaining why DO levels were greater in discharge from the lower exit point and we argue that the relatively small increase in turbidity and sediment delivery we saw was a cheap price to pay for lower summertime water temperatures and increased levels of DO.